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# Atomic Energy: Some Reflections

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*As a graduate student at Columbia University, Dean Purks studied radioactivity under Dean George Braxton Pegram, one of the American pioneers in research on atomic energy. As Associate Professor of Physics at Emory, he traveled to New York in 1936 to extend the University's invitation to Dean Pegram to deliver an address on discoveries in his field during the celebration of Emory's Centennial.*

A RECENT excellent textbook introduces its chapter on Nuclear Physics with a quotation from *The Alchemist,* by Ben Jonson, produced in 1610:

> Aye, for 'twere absurd
> To think that nature in the earth bred gold
> Perfect in the instant. Something went before.
> There must be remote matter.

Three hundred and twenty-two years later Chadwick, in England, discovered the neutron. It was a seemingly innocent sub-atomic particle which, unlike the others, was not endowed with electrical charge. Yet so rapidly did discoveries follow that Dean Pegram of Columbia University (now president-elect) was able to demonstrate the transmutation of platinum into gold by neutron bombardment before a large audience assembled in Glenn Memorial Auditorium during the Emory University Centennial celebration in 1936.

He concluded his address with the statement that the dream of the alchemist was coming true. In March 1939 Dean Pegram went to Washington to establish the first contact of the government of the United States with the phenomenon of nuclear fission.

On August 6, 1945, slow neutrons served as detonating triggers to set off the most powerful explosion that man had ever produced. Uranium atoms split into atoms of lesser mass and complexity, and a vast amount of energy was released in a flash over Hiroshima. A war was as good as over.

In the few weeks which have followed that fateful day much has been written about atomic energy. Yet practically no important information, except the location of research and refining centers, has been released which was not either known or suspected by physicists all over the world before the first of the now obsolete World War II bombs were dropped upon Warsaw by the Luftwaffe in 1939. This may bring comfort to those who fear that the secret will get out. But to those who have known of the possibilities since 1939 it is a grim reminder of several years of deep-seated fear that Great Britain might be blown off the map and our major cities destroyed, leaving the destiny of the human race for centuries in the hands of victorious aggressor nations.

The impression that atomic energy has made upon people is merely a natural reaction to the spectacular. Few people comprehend the significance of energy. Atomic energy is not just another form of energy—a sort of intermediate working state—but rather a primary source of energy. Perhaps it is *the* primary source of energy of the universe. Electricity is not a source of energy; it is merely a form which is easily transmitted from the place where water falls or coal is burned.

If there were no energy, there would be no change of any sort. No life could live. No water would run down hill; no granite would decay; no leaves would rot; no iron would rust; no rain would fall. Nothing would ever happen. No uniform cyclic motion would persist. Thus time itself would lose not only its significance but also the means whereby it is reckoned. The conventional definition of energy, though implying these things, does not clearly set them forth. For the purposes of this article, therefore, energy will be

defined as *the capacity to produce change*. The discovery of a new source of available energy increases the capacity of the human race for the production of changes—changes for good and changes for evil. Yet an increase in available energy does not necessarily increase the tempo of man's activity. Every change involves a transformation of energy from one form to another form.

All of these transformations require some sort of trigger action to set them off. The changes involved in weather and climate, in the growth of plants and animals, in the digestion of food, in geomorphology, and everywhere in man's uncontrolled environment, require their triggers too. A cold mass of air may move in on a cloud formation and cause rain to fall; ultra-violet quanta from the sun may set off the process of photosynthesis; and so on. Primitive man had to live in an almost completely uncontrolled environment. But long ago man learned to make a tiny flame. When applied to combustible material, large amounts of energy could be released and changes would follow. Thus energy may be classified as either 'bound" or "free." Today a simple twist of the wrist and a match is struck. Another slight movement, subject to man's will, and the bound energy of coal or oil or wood is released. A giant dam is built. A hydroelectric plant lies below. The simple act of opening a valve releases the bound gravitational energy of matter situated at a level above its surroundings.

Matches do not release atomic energy. They release bound "chemical" energy, energy which becomes free when an atom combines with another atom without losing its identity. But the neutron, discovered in 1932, acts as a trigger to split certain atoms, causing them to lose their identities. The energy released in such processes far exceeds all known inter-atomic energies. The source of this energy is the actual annihilation of a part of the material of which the atoms are made. The word annihilation, as used here, does not mean mere disfigurement, as when a spider is crushed. It means that after the split, some of the matter simply is not anywhere anymore. Atomic energy therefore involves an exception to the Law of Conservation of Matter. And since energy appears where there was no energy, the Law of Conservation of Energy is involved in the exception. It should not, however, be assumed that these two

laws will be deleted from physics textbooks. All that is necessary is an extension of the concepts of matter and of energy. They are—at least to a limited extent—interchangeable, and the laws are combined into a law of Conservation of Matter and Energy. Einstein has given the necessary extension of these concepts. Many are those who have smiled at the "impractical" theoretician who passed his time thinking about matters which appeared to be quite out of this world. Yet atomic energy is calculated by using an equation which flowed out of the Theory of Relativity by way of the mind of Einstein.

The story of uranium-235 can be summarized briefly. The U-235 atom contains a nucleus of 92 protons and 143 neutrons. The 92 protons identify the atom as uranium; the 92 protons and 143 neutrons identify it as U-235. An atom containing 92 protons and 146 neutrons would also be uranium, but it would be U-238. In fact about 99.3 per cent of all uranium atoms found in nature are U-238. Only about seven-tenths of one per cent are U-235. There are also some U-234 atoms. It follows that in every 1000 pounds of pure uranium there are only 7 pounds of U-235. Separation or alteration of concentrations are very expensive processes. U-238 and U-235 have identical chemical properties. They cannot be separated chemically. Physical means must be employed. Among the possibilities for separation are centrifuge, diffusion, mass spectograph.

When a slow neutron enters a U-235 nucleus, a resulting instability causes the nucleus to explode. The neutron must be slow. Its capture by a nucleus may be likened to a slow golf ball rolling into a cup. A fast one might roll right across without dropping in. The atom breaks into several parts. For example, it may divide into a barium nucleus holding 56 protons and some neutrons, a krypton nucleus holding 36 protons and some neutrons, and a few neutrons which do not attach themselves to either the barium or the krypton. These free neutrons are potential triggers to set off the next U-235 atom, and so on. But these free neutrons are not necessarily slow neutrons. They must be "slowed" before they can act as triggers. Therefore something must be mixed with the U-235 for this purpose. Light atoms are very effective. On passing through water, a hydrogen-bearing substance, neutrons are slowed very effectively.

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The U-235 atom has a mass of about .0000000000000000000-0039 grams. When it splits, about one-tenth of one per cent of this mass is annihilated. Einstein's mass-energy equation shows that the annihilated mass is equivalent to about .000000000000000009 kilowatt hours of energy. This amount of energy is so small that it would scarcely disturb an amoeba. But in one pound of U-235 (the size of a golf ball) there are about 1,200,000,000,000,000,000,-000,000 (twelve hundred thousand billion billion) atoms. The splitting of all of the atoms in one pound of U-235 would therefore release about 10,800,000 kilowatt hours of energy. Imagine 10 pounds of this element exploding within a very limited volume in a fraction of a second. Imagine the heat, the percussion wave, the devastation. The pictures of Hiroshima tell the story.

The broad outline of the problems facing those who would use atomic energy was quite clear in 1939. First uranium had to be obtained in greater quantity. Then U-235 had to be separated from U-238. Next a concentration arrangement had to be devised which would assure that the free neutrons from an exploding atom would first be slowed down and would then strike other U-235 atoms before escaping to the outside of the body of material. Finally it was necessary to control the chain of explosions for purposes of safety. The scientific mobilization began. History will probably show that but for the unqualified support of the project by Mr. Roosevelt and Mr. Churchill and the decision to give priority to the European theatre of war, the Allies might have lost.

Very little information has been released about plutonium. In 1934, Fermi, in Italy, bombarded uranium with neutrons. His findings led him to suspect that he had created a new element beyond uranium, an element of atomic number 94. While performing similar experiments in 1938, Hahn, Strassman, and Meitner, in Germany, discovered barium in the resulting matter. It appeared then that Fermi was wrong; that instead of producing an element beyond uranium, the "new" element was actually barium, a well-known element of less complexity than uranium. Since it now appears that plutonium may be made by bombarding U-238 with neutrons and that barium may result in the split of U-235, we may suspect that both Fermi and the Germans were correct; that both made plu-

tonium and barium, but that Fermi detected only plutonium, and the Germans detected only barium.

Large-scale peacetime use of atomic energy will depend on a number of factors. Among these are: undisclosed pure-science discoveries since 1939; the supply of uranium; the possible release of atomic energy from more plentiful elements; the training of a generation of engineers who understand nuclear physics; the amount of freedom granted to investigators. The full impact of a scientific discovery upon the human race requires time. Generally it requires nearly a century. The stages in the process are: (1) the pure-science discovery; (2) the development of a device for its application by applied science and invention; (3) the risk of capital on the manufacture and sale of the device; and (4) the desire of the public to use the device. Each of these stages has a tendency to reinforce the others as the development proceeds.

The United States would do well to study carefully the true history of the development of atomic energy. The roster of names associated with the major pure-science discoveries contains some Americans. But it consists primarily of Europeans: Becquerel, Curie, Einstein, Planck, Rutherford, Aston, Bohr, Chadwick, Fermi, the Joliots, Hahn, Strassman, Meitner, and many others. Because of our propensity for doing big things in a big way, for glorifying the seemingly practical, we are too inclined to overlook the little things which make the big things possible. We tend *to do;* we frequently are behind in our *thinking.* Our young men are so fascinated by the glamour of engineering that there is a severe drain of talent away from pure science. The public and the press, and to some extent the educational system itself, confuse development and use with investigation and discovery. As a result we have been too dependent upon the Old World for the discoveries which we use so widely. Of the four stages of progress toward widespread use, we are relatively weak in the initial. But we are the strongest nation on earth in the other three stages. For we have developed applied science to an extent found nowhere else; we have had the capital to risk and we have risked it; we have liked the machines and devices and we have bought them. Yet we are vulnerable nationally as long as we are weak in basic research. Recently Dr. Vannevar Bush,

Director of the Office of Scientific Research and Development, and Senator Kilgore made surveys of the situation. The following quotations are taken directly from *Higher Education and National Defense,* a publication of the American Council on Education, dated August 20, 1945, summarizing points of agreement in the Bush and Kilgore reports:

> The proportion of pure research to applied research has decreased steadily during the war.
>
> American colleges and universities have not done basic research comparable to that of European and especially German institutions.

The position of the entire world in relation to biological science is comparable to that of the United States in physical science. The glamour and the opportunities for direct service which attach to the applied science and art of medicine have quite overshadowed basic investigation in biology. Medicine rightly concentrates its attention upon the clinical behavior of the patient, subject as he is to uncounted variable factors. Yet in order to stop the ravages of infantile paralysis, cancer, malaria, and heart disease, it is likely that many competent investigators must begin to study nature rather than the patient. The applied science of medicine appears to be based upon a pure-science structure that is far behind that upon which engineering is built. Mendel, the Moravian monk, wrote an important paper on heredity in 1865 which lay undiscovered until De Vries, Correns, and Tschermak brought it to light at the turn of the century. The chromosome was not even named until 1888. The present concept of the gene came only in the twentieth century. Harvey's *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus* was published in 1628. Yet with heart disease making increasing inroads into civilization, many basic questions relating to the biology and the chemistry and the physics of the circulatory system remain unanswered in 1945. As a result of a relatively weak basic structure, many fundamentals of clinical procedure are missing, and the great killers continue to take a heavy toll.

Furthermore the liaison between pure science and medicine is not established to the extent that it is with engineering. Engineering, by way of its industrial connections, is involved in effective massive

organization. The formula for cooperation lies within the organization. On the other hand, medicine, an art as well as an applied science, is practiced largely on a basis of relations between an individual physician and an individual patient. The lack of effective liaison with basic science can therefore be explained. The results, however, cannot be expected to be conducive to progress comparable to that in engineering and in industry. The Massachusetts Institute of Technology does not staff its faculty with a high fraction of professional engineers. The Bell Telephone Laboratories may rightly be proud of its large corps of top-flight pure scientists who work on basic problems. There must be a formula for effective cooperation between basic science and medicine.

The secrets of nature are never safe from the inquiring mind of the basic investigator. Much is being said now about the necessity for extreme measures designed to hold the "secrets" of the atomic bomb. The public should be on guard against foolish, misguided action. Decisions on national policy should be made in the face of the following realities: (1) the basic facts essential to the production of the atomic bomb have been known throughout the world for several years; (2) minor technical secrets relating to production serve only delaying tactics; (3) Great Britain, Belgium, and other countries, including Russia, are better supplied with sources of uranium ore than the United States; (4) the United States is not noted for its contributions to basic research; (5) during the war the United States has cut off her continuing supply of scientists, while other nations have not done so.

Should we foolishly attempt to block the exchange of information between basic investigators and between teachers and students, we would *not stop* the progress of other nations and would *definitely weaken* our own precarious position. In the interest of national safety and the welfare of the human race a clear policy appears to be indicated: proceed with all speed to learn more about the atom; proceed to use it for peace and for plenty; pray to Almighty God for the will and the wisdom to serve His purposes.

The slow neutron has cast a fateful die. The mind of man brings him ever nearer to his God. And in His presence there must be purity of heart—or else.

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# Methodism and the Negro Prior to the Civil War

*By* HENRY M. JOHNSON

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METHODISM was brought to America while the movement was yet in its infancy, and the Negro was destined to play a large part in its growth and history. When John Wesley came to Georgia in 1735 with a commission from the Governor to act as a missionary, he had the authority to preach to the white settlers, the Indians, and also to the Negroes, some of whom had already been brought to this continent as slaves. During his comparatively short mission in Georgia he made attempts to provide for the salvation of the colored people, laboring among them and preaching to them as he had opportunity. During his homeward voyage to England, he found the opportunity to give instruction to a Negro youth, and before leaving the ship he wrote the following statement concerning his work in America: "All in Georgia have heard the word of God, and some have believed and begun to run well. A few steps have been taken toward publishing the glad tidings both to the African and American heathens." Wesley's concern for the religious life and welfare of the Negro race did not end with these early experiences, but continued until his death. He was a friend and inspirer of the leaders in the movement for the abolition of slavery, and his concern for the Negroes' physical freedom was closely related to his interest in their spiritual liberty. One of the General Rules, prepared by Wesley in 1739 for the English societies, forbade "the buying or selling the bodies and souls of men, women, or children, with the intention to enslave them." His pamphlet, *Thoughts Upon Slavery,* published in 1774, enjoyed a

wide circulation and was a strong appeal for the abolition of the institution of slavery.

When Robert Strawbridge, a native of County Leitrim, Ireland, came to America sometime between 1760 and 1766, and planted the first Methodist societies in Maryland, a Negro called "Aunt Annie" was included in the membership of the society at Sams Creek. Other Negroes were active in the launching of the Methodist movement in the Southern colonies, among whom was Samuel Coker. He later became a prominent figure in the establishment of the African Methodist Episcopal Church, and had the honor of being the first American Methodist missionary to Africa.

In 1769 Richard Boardman and Joseph Pilmoor landed near Philadelphia as the first missionaries of the Wesleyan Conference to America. Less than a year later Pilmoor wrote to Mr. Wesley saying, "The number of blacks that attend the preaching affects me much." During the years 1773 to 1776 a great revival of religion swept through a large part of Virginia and North Carolina, and the preachers who witnessed these meetings state that hundreds of Negroes were present at the services, and were deeply influenced by the preaching. Prior to this time no special provision had been made for Negroes in the churches, but they were allowed to worship with the white members in the congregations. In other places where this practice was not followed, the Negroes stood outside the church listening to the preaching within. The early Methodist preachers in America made it a habit to preach to the Negroes whenever opportunity afforded. Freeborn Garretson, one of the Methodist preachers of this time, often preached to Negroes, and considered it a high privilege. He stated that often while he preached, "many of their sable faces were bedewed with tears, their withered hands of faith stretched out, and their precious souls made white in the blood of the Lamb."

Before the organization of the Methodist Episcopal Church in America in 1784, a concern for the provision of religious instruction of the Negroes was manifested among the leaders of the movement. At a meeting of the Methodists at Baltimore in 1780, provisions were made for the appointment of assistant ministers to

meet with the colored people for purposes of instruction. The first official pronouncement of the Methodist Episcopal Church regarding the development of spiritual life among Negroes came in the year 1787. The Minutes of the Conference for that year urged all ministers and preachers "to leave nothing undone for the spiritual benefit and salvation of them within their respective circuits and districts," and admonished the preachers to "exercise the whole Methodist discipline among them."

At the time this action was taken by the Conference, the Negro membership among the Methodists numbered 3,893, an increase of two thousand or more over the previous year. The response of the Negroes to the appeal of the Methodist preachers is evidenced by the growth of their numbers during the latter part of the eighteenth century. In 1790 the number of Negro Methodists was listed at 11,682.

The pioneer Methodist, Bishop Francis Asbury, took an active interest in the welfare of the Negro. During his travels up and down the eastern seaboard, he preached to them in the churches and in sheds on the plantations. Many planters, who had begun to show concern for the religious life of the slaves, urged Asbury and other preachers to perform this religious service. At the plantation home of Mr. Henry Gough in Maryland, a chapel was erected and regular services were provided for the Negroes as well as the whites. Asbury often held religious "love feasts" for the Negroes of this plantation. When opposition to the ministry of the early Methodist preachers arose, Asbury regarded it as opposition to the advancement of the Kingdom of God, and wrote in his *Journal* on June 2, 1776: "After preaching at the Point, I met a class and then the black people, some of whose unhappy masters forbid their coming for religious instruction. How will the sons of oppression answer for their conduct, when the Great Proprietor of all shall call them to account."

A slave belonging to Mr. Gough eventually became one of Bishop Asbury's efficient and dependable helpers. His name was Harry Hozier, although he was widely known as "Black Harry." After his conversion in a plantation service he soon became a religious

leader among the whites as well as the blacks. Although he was illiterate, he had a great degree of intelligence and a natural talent for oratory. With the permission of his master, he accompanied Bishop Asbury on his itinerant journeys, frequently preaching to large gatherings. When Dr. Thomas Coke arrived in America from England, he began an extensive preaching tour throughout the Methodist societies in preparation for the Christmas Conference, and at Asbury's suggestion secured the services of Black Harry as an assistant. Dr. Coke wrote shortly after: "I am pleased with Black Harry's preaching."

When Bishop Asbury started a Sunday school in the house of David Crenshaw in Maryland, in 1786, both Negro and white youth attended. Four years afterward, the General Conference of the Methodist Episcopal Church undertook the establishment of Sunday schools to teach the poor black and white children to read. The Conference recommended the schools, and the appointment of persons to teach gratis "all that will attend and have a capacity to learn." Week-day schools for the same purpose were also introduced, but these schools were never very successful, and in later years the enterprise was abandoned by the Methodists because of the bitter controversy over the abolition of slavery.

The greatest advance toward the religious evangelization of the Negroes came with the revival movement which began in the last decade of the eighteenth century and spread over large parts of the country. Many slaveowners were converted and thereafter took a different attitude toward the religious welfare of their slaves. The Methodists were prominent in this religious movement, and the popular institution known as the "camp meeting" as developed by the Methodists was especially attractive to the Negroes. Thousands came into the Church through this agency. By 1800 the Negro membership of the Methodist Church had been increased to 13,452. In 1803 the total was reported at 22,453, and in 1815 the number had reached 43,187. While Matthew Arnold was in America he was told in Boston "that the great number of Methodists in this country was to be accounted for by the fact that so many of them were Negroes, or words to that effect."

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The earliest attempt to educate the Negro in America was motivated by the belief entertained among clergymen that education was necessary to provide for his moral and religious needs. White America, both slave-holding and non-slave-holding, was of the opinion that some moral discipline should be developed for the blacks. Their teachers, usually members of the clergy or laity of the Christian churches, made their duty a religious one. It was their belief that only through a new character and a changed life could the Negroes be made law-abiding, decent, and industrious people. Thus their teachings were predicated upon the Bible. The Methodists, confined at first largely to the Southern country, where most of the slaves were found, took up the problem of the education of the Negro. In 1800, the chief incentive to their education in Georgia came from the rising Methodists and Baptists who, bringing a simple message to plain people, instilled into their minds the idea that the Bible being the revelation of God, all men should be taught to read it.

By 1820 the interest of Methodists in the religious instruction and conversion of the slaves had increased to a considerable degree. The leaders of the Church urged definite steps toward reaching the Negroes living on the large plantations in the South, who were largely out of touch with the traveling ministers and church services. At the General Conference of 1820, Bishop McKendree made an appeal to the body urging all Methodists to take concrete action toward improving the spiritual life of the Negroes. Their membership in the Church was estimated at this time to number 38,753.

In 1825 there appeared in the city of Charleston, South Carolina, a Methodist weekly periodical called *The Wesleyan Journal.* It was edited by a group of ministers who advocated better training for the Negroes of the South, and the paper influenced all denominations in the South toward increased interest in this mission. A young minister of the Methodist Church, James O. Andrew, later to have an important part in the division of the Church, wrote an article for the *Journal* of July 1, 1826, challenging the Church to assume responsibility for the religious training of slaves. He wrote: "We have the best possible evidence that the Negro in his most degraded

situation can be brought to feel the powerful influence of the gospel principles, and can exhibit in his life . . . the reality of his religious experience." This new emphasis upon the religious training of the Negroes produced a remarkable effect. Many planters asserted that there was a marked improvement in the conduct of their slaves.

The new interest in Negro evangelization had its greatest development in the state of South Carolina under the leadership of Dr. William Capers. He, along with Bishop Andrew, earnestly promoted missionary work among the slaves. Capers prepared catechisms for instruction of the Negroes and gave much of his own time and efforts in conciliating certain slaveholders to his mission and perfecting plans for the enterprise. Dr. Capers' plan of enlightening the Negroes did not include literary instruction. His aim was to adapt the teaching of the Christian religion to the understanding of persons having a "humble intellect and a limited range of knowledge by means of constant and patient reiteration." The old Negroes, under his plan, were to look to the preachers for the exposition of the Christian truths, and the young children were to be turned over to catechists who would drill the fundamentals into their plastic minds. Yet all the instructors and preachers to the Negroes were required to inculcate the faithful performance of the duty of obedience to their masters as the Southerners found it stated in the Bible. Anyone who failed to interpret the Scriptures in this manner was not engaged to teach Negroes. Dr. Capers stated that "such a one could not then be found among the preachers of the Methodist Episcopal Church of South Carolina."

The results of this mission to the slaves were gratifying. Preachers were trained among the Negroes who "could read well and preach well." The lower part of South Carolina was reported to be "covered over by the missions." At the close of the year 1832, the South Carolina Methodists reported that through the agency of the missions the Church had received 1,395 members, and 490 children were under catechetical instruction.

Until the 1830's there had been little opposition to the education of Negroes, but several slave insurrections in the Southern states caused Southern people to look upon it with suspicion. When it be-

came evident that abolition literature in possession of the Negroes caused dissatisfaction among them, and prompted some to take drastic measures to secure their liberty, laws were passed in most Southern states forbidding the instruction of slaves in any form. After these laws were passed, American slavery extended to the mind as well as to the body, and the education of Negroes was regarded as inconsistent with the institution of slavery.

Following the reaction against Negro education, the Church in the South ceased to be the means of literary instruction. The Sabbath schools, in which many had been taught to read and write, by 1834 had restricted their work to oral instruction. There followed a period of "religion without letters," in which the Negroes were catechised in the elementary Christian truths. Although some ministers ignored the laws prohibiting the instruction of Negroes, education among them was at its lowest point from this time until the Civil War.

It is scarcely possible to survey the work of the Methodist Church among the Negroes prior to the Civil War without some mention of the attitude of the Church on the subject of slavery. The Conference which met in the city of Baltimore in 1784 and organized the Methodist Episcopal Church was marked by its stand on the subject of slavery. The General Rules, which Mr. Wesley prepared for the English societies, and which contained a rule forbidding the buying and selling of slaves, was adopted by the Conference. The body went beyond the adoption of this rule and took steps to extirpate the whole system of slavery. The rules adopted by the Conference of 1784 remained in force for a number of years, and some Methodist ministers preached boldly against slaveholding. A number of slaves were given their freedom by members of the Methodist societies.

This firm stand of the Methodists, however, was beginning to lose ground among members in the South, and the Church began to retreat from its well-defined position of 1784. When the invention of the cotton gin in 1793 changed the economic life of the Southern states, the Church ceased to maintain its stand against slavery on moral grounds. The *Discipline* of 1786 forbade the

buying or selling of slaves, but it said nothing against slaveholding. In 1792 the Church receded still further by omitting the law of 1786, and retained only the prohibition against slavery in the General Rules.

The early Methodist leaders, who had been bold in denouncing slavery as an evil, found that if Methodism was to succeed in the South it must not openly oppose slavery in that section. When Thomas Coke found that his opposition and that of his Church to slavery was causing people to turn from the Methodist Church, he altered his sermons on the subject to suit the ears of his hearers. Bishop Asbury, who bitterly opposed the institution of slavery, had quite the same experience. To the slaves he insisted that they should "obey their masters with fear and trembling as unto Christ"; then the masters would listen intently to the message for them. Even Peter Cartwright, one of the boldest of Methodist preachers, employed the same method. He said: "Let the owners see and know that your whole mission is the salvation of the slave as well as their own, and that you have not established an underground railroad, and that it is not your mission to abduct the slaves. In this way more can be done for the final extirpation of American slavery than all others put together." The attempt to appease the Southern objectors went so far that the Church auhorized an edition of the *Discipline* for use in the Southern states with the section and rule on slavery left out. By 1809 the Church said nothing about the owning of slaves on the part of its members, and only prohibited the election of a slaveholder to an official position in the states where emancipation was legally possible. In the next few years a few minor changes were made in the *Discipline* regarding slavery in the Church, and in 1824 the section on slaveholding was amended for the last time until 1860.

The rise of the Abolition Movement made itself felt in the Methodist Church, and a number of anti-slavery societies were formed in the New England conferences. The bishops of the Church were anxious to preserve peace among the members. In 1835, Bishops Hedding and Emory addressed a letter to the New England and New Hampshire conferences, stating that nowhere else

in Methodism had they found such excitement, and that they regarded the Abolition Movement as a political game into which the ministers should not be drawn. The bishops also urged the members of the conferences to refuse the use of their pulpits to those preachers who persisted in leaving their own charges to agitate and divide other societies.

There was considerable opposition to the abolitionist agitator in the Northern conferences of the Methodist Church. When many petitions were received at the General Conference at Cincinnati in 1836, asking for a stricter stand on the slavery question, the Conference replied by adopting a report condemning "modern abolitionism." The Conference also censured two New England delegates for attending a meeting of a Cincinnati anti-slavery society. After 1837 every candidate applying for admission to the Philadelphia conference was asked, "Are you an abolitionist?" and if he replied in the affirmative, he was not allowed admission.

Despite the efforts of the General Conferences to bring pressure on the anti-slavery element in the Church, Methodists in the North who favored abolition continued their support of the movement. Behind this movement was a group of members who stood for the broad humanitarian mission of the Church. They admitted that the "scope of the Church and its authority was fixed by the Bible," yet a less strict interpretation of it was permitted. The adherents of this view advocated a definition of moral evil or sin in the Scriptures by implication. Thus the agitation against the institution of slavery continued. Among Methodists in the Southern states another theory concerning the scope of the activities of the Church had been gradually developing. Its adherents held that these activities were distinctly defined by the Scriptures; that the Church and the secular world were separate spheres, and any merging of the two in a program of action should be condemned. To them slavery, being recognized by the Scriptures as an institution subject to temporal powers, was a subject with which the Church had nothing to do save to enforce the moral obligations growing out of the relationship between master and slave. Therefore, the existence of slavery as an institution was a political question, hence one with

which the Church should not meddle. Bishop Capers, the "apostle to the slaves," regarded the subject of abolition as one belonging to the state, and denounced the principles of the abolitionists as being rooted in a false philosophy. He endeavored to prove that the relation of slave and master was authorized by the Scriptures, but he was of the opinion that slavery might give rise to certain abuses which were immoralities to be prevented or punished by proper means, both by the Church and the civil authorities. In 1837, the Georgia Annual Conference went on record as recognizing slavery as an evil, but further stated that it did not recognize it as a *moral* evil. The conference passed a resolution stating that slavery was a civil and domestic institution, and one with which, "as ministers of Christ, we can have nothing to do, further than to ameliorate the condition of the slave, by endeavoring to impart to him and his master the benign influence of Christ, and aiding both on their way to heaven."

By 1844 it was evident that the sentiment in both the North and South had crystallized with regard to the subject of slavery, and each section felt compelled to maintain its own attitude on the question. At the General Conference of 1844 the question of slavery came up early in the proceedings and occupied the center of the stage throughout the session. A deliberate attempt was made by the bishops to divert the mind of the Conference from the slavery issue, but without success, and a committee was appointed to deal with the explosive question.

The great discussion at this Conference came up in connection with the report of the Committee on Episcopacy. During the preceding quadrennium Bishop James O. Andrew of Georgia, had, through inheritance, bequest, and marriage, become in a technical sense, a slaveholder. The committee investigated the affairs of Bishop Andrew, and when the matter was brought before the Conference, a resolution was passed requesting him to desist from the exercise of his episcopal duties until he had freed himself from this connection with slavery. The resolution was adopted by a vote of 110 to 68. This action was followed by a debate lasting for eleven days, which only served to increase the divergence between

the North and South with regard to the scope and function of the Church.

The bishops attempted to bring about a compromise on the question, suggesting that the entire matter be postponed for four years, and that during this interval Bishop Andrew might be able to free himself from his embarrassment. This suggestion aroused the abolitionists, and they succeeded in persuading Bishop Hedding to withdraw his name from the bishops' report. Since the report was no longer unanimous, their suggestion was laid on the table. When the vote was taken on the suspension of Bishop Andrew, it was carried by 111 ayes to 60 nays. Thus the Methodist Episcopal Church had come to the parting of the ways, and the Methodist Episcopal Church, South, came into being.

The anti-slavery issue in the Methodist Church did not affect the enthusiasm of the Methodists in the South in their mission work among the slaves. The responsibility for directing and promoting the missions fell largely to Dr. William Capers, who became the first superintendent of the work. He prepared a catechism for the use of missionary instructors who were employed as teachers among the Negroes. During the stormy session of the General Conference of 1844, Capers revealed something of the spirit of the Southern conferences in their work among the slaves. He made an impassioned appeal for the continuation of the missionary enterprise, and stated that the Southern conferences were reaching 100,000 Negroes in the missions.

The views of the Southern Methodist Church on the subject of slavery and its policy in evangelizing the Negroes brought it into perfect harmony with Southern politics and the existing social order. It was thus prepared, under the protection of Southern slaveholding practice and sentiment, to continue and enlarge regular missionary work among the slave population. During the period 1846-1861, the Negro membership of the Southern Methodist Church rose from 118,904 to 209,863. It is estimated that from 1844 to 1864, the Methodist Episcopal Church, South, expended $1,800,000 in the plantation work among the slaves.

While the oral instruction of the slaves was being carried for-

ward in the South, the Methodist Episcopal Church in the North established the first Methodist institution of higher learning for the education of the colored people. At a session of the Cincinnati Conference in 1853, a movement was inaugurated which eventually led to the establishment of Wilberforce University. On August 30, 1856, the institution was organized and incorporated, and named in honor of William Wilberforce, the English philanthropist and abolitionist. Before the Civil War many of the students of Wilberforce came from the South, and were supported by the wealthy planters of the Southern states.

This, briefly, is a summary of the efforts made by the Methodists prior to the Civil War to elevate the Negro and improve his moral and religious condition. While there was disagreement among the Northern and Southern Methodists as to the policy of the Church in relation to the colored race, both bodies attempted to minister to its needs. By 1863, it is estimated that a quarter of a million colored people had been trained, even though crudely, in Methodist discipline, doctrines, and moral ideals. In the South, the Negro worshiped in churches with the whites and had the advantage of hearing the excellent preaching of the time. Through the activities of the Methodist Church, he had been given the rudiments of religious thought, and although he could not and was not permitted to read, he committed many passages of the Bible to memory from oral instruction. Through the missions on the plantations, the religious programs in local churches, and efforts put forth by religious groups other than Methodists, the Negro was schooled in the fundamentals of the Christian religion. Up until the time of the Civil War, most of the religious work among the Negroes had been done by the Methodists of the South; however, after the war the situation was reversed, and the Northern Methodists inaugurated an educational and religious program among the Southern Negroes which was to become perhaps the greatest single contribution of Methodism to the Negro race.

# Humor in Ante-Bellum Georgia

## The Waynesboro *Gopher*

*By* BERTRAM HOLLAND FLANDERS

*Bertram Holland Flanders, A.B. '29, M. A. '30, Ph.D. (Duke) '42, is Professor of English at North Georgia College, Dahlonega. The University of Georgia Press published last year his* EARLY GEORGIA MAGAZINES: LITERARY PERIODICALS TO 1865.

ONE OF the most characteristically Southern types of literature in *ante-bellum* days was the humorous tale, popularized in Georgia in the 1830's and 1840's by Augustus Baldwin Longstreet and William Tappan Thompson and later employed by Joseph Addison Turner, Bill Arp (Charles Henry Smith), and Richard Malcolm Johnston. Much of this humor was an attempt to re-create the simple, and sometimes shockingly informal, life of the common people of Middle Georgia. These tales of humor made their first appearance in the newspapers and periodicals of the state before being published in book form. The early stories of Longstreet and Thompson, for example, first appeared in the Milledgeville *Southern Recorder,* the Augusta *State Rights' Sentinel,* the Augusta *Mirror,* and the Madison *Southern Miscellany.* The literary periodicals of Georgia also played up the tale of humor as far as their contributors would co-operate with them. Prominent among these publications were the Augusta *Mirror* (1838-41), the Macon *Family Companion* (1841-43), the Penfield *Orion* (1842-44), the Madison *Southern Miscellany* (1842-46), and the Savannah *Friend of the Family* (1849-51). Some of these tales were in "cracker" dialect, but most of them depended for their humor upon situation rather than upon dialogue.

Magazines devoted wholly to humor were attempted by several editors, but none attracted more than passing attention. The most ambitious ventures were the *Horn of Mirth* (Athens) and the *Bugle-Horn of Liberty* (Griffin). The *Horn of Mirth* ran monthly from July 1849 to August 1850, and was edited by Thomas A. Burke, also the author of humorous stories. But though the U. S.

Census lists it as having 1,200 subscribers in 1850, not a single issue has been found. The *Bugle-Horn of Liberty* appeared monthly from July to October, 1863, and attracted some attention through its contributions from Bill Arp, a Georgia humorist of the Artemus Ward type. Only two numbers of this periodical are known to exist, and their contents are of mediocre quality.

Several other humorous publications actually begun in Georgia were:

*Tomahawk* (Macon), published by B. F. Griffin and edited by "Peter Pickle" (Joseph Addison Turner). Its aim was to "dissect the various follies and absurdities of the present day." Only one number was ever printed, in 1853, and no copy of that has been found.

*Punch* (Augusta), devoted to wit and humor and "filled with humorous articles and illustrated with rich engravings." Thus wrote Edward A. Rice, editor of the Waynesboro *Gopher,* who declared, in the August 11, 1860, issue of his paper, that he had just bought a copy of the paper at the "depot."

*Sky Rocket* (Waynesboro), monthly devoted to "Fun, Fact and Philosophy," edited by James C. Kenney. It was begun prior to May 1860, and was discontinued in August 1860, according to the Waynesboro *Gopher.* The U. S. Census for 1860 records 300 subscribers for the *Sky Rocket.*

*Gopher* (Waynesboro), semi-monthly, edited by D. M. Burgay and Edward A. Rice, from May to December, 1860. The U. S. Census for 1860 records 50 subscribers for the paper.

The time was apparently not ripe in Georgia, nor in the South, for that matter, for the permanent establishment of a periodical wholly given over to humor. Meanwhile the various literary periodicals, and a few newspapers, supplied the reading public with humorous material that perhaps kept the publications going when nothing else would have done so.

Waynesboro—*Gopher* (1860)

TITLE: *Gofer,* May, 1860 (Vol. I, No. 1); *Gopher,* May 26, 1860 (Vol. I, No. 2)-December 29, 1860 (Vol. I, No. 15).

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FIRST ISSUE: May, 1860 (no day given). LAST ISSUE: December 29, 1860.

PERIODICITY: Semi-monthly (sometimes appearing a week early or a week late).

EDITORS AND PUBLISHERS: D. M. Burgay and Edward A. Rice, May-June 9, 1860; Edward A. Rice, June 23-December 29, 1860; J. T. Darlington, associate editor, May 26-July 21, 1860.

LOCATION OF FILES: Emory University: May-December, 1860 (complete file).

In May 1860, in the little town of Waynesboro, Georgia, appeared the first number of the *Gofer,* the "Only Original Comic Paper published in Georgia" (declared the editor in a later issue), which was to appear "semi-occasionally" at ten cents a copy. This paper, the work of D. M. Burgay and Edward A. Rice, carried the following "Salutatory":

> In establishing the gofer, we haven't much to say, as the public will not expect much from us.
>
> We shall proceed to say what we please on all subjects or *off* of all subjects, and those that don't like our position may go to—Texas.
>
> We believe all men are created equal except niggers (and they hain't got any right to anything only what their masters give them) we allude to foreigners, we believe a dutchman is as good as a white man as long as he behaves himself, and we believe one Irishman is as good as another and a heap better.
>
> We believe the women would occupy less room if they would not wear such large hoops, but we believe they have a right to wear what they please, if it is nothing but hoops.

The first number of the paper, consisting of four quarto pages, three columns to a page, contained jokes, conundrums, and a short negro sermon in dialect. Advertisements took up little more than a single column of the final page. Most of the editorial comment was in "cracker" dialect, sprinkled with misspellings. Several cuts broke the monotony of the printed pages, but as a whole the issue was crudely gotten up.

The second issue, with the name now appearing as *Gopher* and with J. T. Darlington as associate editor, come from the press on May 26, 1860, with a subscription price listed at fifty cents for one year or thirty cents for six months. The editors declared, by way of promise for the future, "We have engaged the services of some of the greatest clowns in the state to contribute to its columns." The editors also continued the attack, launched in the first number, on what was apparently their competitor in the realm of humor, the monthly Waynesboro *Sky Rocket,* devoted to "Fun, Fact and Philosophy" and edited by James C. Kenney. Succeeding issues pressed the attack upon the *Sky Rocket* until the demise of the latter in August 1860, reported in the *Gopher's* "Obituary of the Monthly Sky-Rocket, Esq., aged—several months." Humorous advertisements and additional cuts made this second number more attractive than the first, though the general contents were mediocre.

It seems rather unusual for a small town like Waynesboro to have had at the same time the four papers listed in the second number of the *Gopher:* the *News,* the *Independent South,* the *Sky Rocket,* and the *Gopher.* The U. S. Census for 1860 gives their subscription lists as, respectively, 1500, 700, 300, and 50. According to the same census the population of Waynesboro was 307, of whom 155 were slaves. The population of the entire county (Burke), however, was 17,165, of whom 12,052 were slaves. A study of the advertisements in the *Gopher,* as well as of the scattered references to the other three papers, leads one to the conclusion that the *Gopher* was published by the *Independent South* and that the *Sky Rocket* was likewise the work of the *News.* Obviously two humorous papers with small subscription lists in the same little town could hardly last any length of time, and apparently both these papers were journalistic experiments by newspapers that already had substantial constituencies behind them.

Although the *Gopher* is barren of any outstanding piece of humorous writing, one series of letters, poems, and news items involving "Grum Gopher, Esq., of Gopherville" is worthy of comment. In the issue for August 11, 1860, Grum Gopher declares in a letter to the paper that one day he bored through the earth until

he came to the land of China, where he fell in love with Phew-phew, the charming daughter of Kno-phew. In a poem composed for his lady love the eloquent Grum proclaims:

Lying on the verdant grass,
  In the Flower Land,
Many thoughts arose, alas!
  Which I could not withstand.

I thought of thee, dear Phew-phew—
  Of thy loveliness so sweet;
And of that pretty little shoe
  On each of thy tiny feet.

I thought I'd love to take thee
  To my pleasant gopher hole,
Where I would proudly make thee
  Mistress of my gopher soul.

Later numbers of the paper printed a letter from the adorable Phew-phew, sent by her to Grum by means of her lapdog Kang-kang, and an account of Grum's final trip to China to win the beautiful lady. In the latter Grum describes his Chinese wedding, at which the bride showed such composure that she fainted only four times during the ceremony. The "Grum Gopher" series comes to an abrupt end in the issue for October 25, 1860, with an account of the honeymoon trip of Grum and Phew-phew by sea to New York, where the former got drunk and disappeared, leaving his bride disconsolate. The next number of the paper was one week late in appearing, says the editor, because of the loss of the valuable services of Grum Gopher.

The following "Obituary of Jem Bangs" is typical of the general humor of the *Gopher:*

Piece to his remanes.
  he died in his bed
  a great big buk he red,
  a prayer he loudly sed,
  then turned over on 2 his bed,
  and Derned if he didn't died—dead!

He leves a wife 8 children a cow, 4 horses a grocery stear [stoar?], and other quadrupeds to mourn his ontimely loss. His loss is their eternal gane.

After the first few numbers the *Gopher* devoted most of its space to the political controversy then agitating the nation. In 1860 there were four candidates for the presidency: Stephen A. Douglas, Northern Democrat; J. C. Breckenridge, Southern Democrat; Abraham Lincoln, Republican; and John Bell, Constitutional Unionist. The split in Democratic ranks over the slavery question had divided the South between Douglas and Breckenridge, with a small group championing the candidacy of Bell, of Tennessee. Though the *Gopher* may have been launched for the sole purpose of fun, it continued with a strong determination to defeat both Douglas and Lincoln. In the June 23 issue of the paper the editor affirmed: "We are . . . Hard-shell, Southern Rights, anti-Douglas Democrats." And perhaps to emphasize this stand, the paper, in its "Pictorial Dictionary," gives the following definition:

> NEGRO.—A thick-liped, long-headed, flat-footed, broad-nosed, kinky-haired, dark-skined individual, who makes bread for the whole country, and is kicking up a terrible muss among polititions, demagogues, Charleston and Baltimore Conventions and all such humbugs.

On July 21, 1860, appeared the following item:

> DOUGLAS MEETING—A very enthusiastic meeting of the Douglas party was held in this town the other day. There were at *least* three men in the meeting, and two of them were Breckenridge men. All the Douglas men in this place were in attendance.

Other interesting items in this political controversy are listed below:

> July 21, 1860—A satirical card advocates Herschel V. Johnson, of Georgia, for Vice President, and S. A. Douglas, of Illinois, for President. Johnson's "Letter of Acceptance" on the last page is a blank column ending with "These, gentlemen, are my honest sentiments."
>
> August 11, 1860—Item: "If Lincoln becomes President, should not the White House be called the Black House"?
>
> October 4, 1860—Under "Diseases of Douglas" the editor

asks, "Where was Douglas when the Fugitive Slave Law was voted on? *He had a fit of peedodles with a touch of the double wabbles.*"

Presidential poll taken by Grum Gopher on board the ship bringing him and his bride Phew-phew to New York:

"For Bell—Phew-phew, Kang-kang, myself and baggage, consisting of fourteen trunks.

For Breckenridge—Two of my servants (Chinese) who don't understand English, and the man who makes the cabin fires—a Cockney passenger calls him 'the fire-eater.'

For Douglas—Two gallons of *Scotch* whisky.

For Lincoln—The Cook—a *rale* live African."

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October 25, 1860—The editor humorously declares his choice for President to be "The Hon. Benajah Cullers, of Lincoln County, Ga., a native Georgian of the Longstreet style."

November 15, 1860—The election of Lincoln is announced. A Southern Confederacy is recommended.

December 7, 1860—Almost a whole page is given to a cartoon of Lincoln "coming South to whip South Carolina and Georgia into the Union."

Advertisement: "WANTED—To know who the young men were who went to see some young ladies and ran off in such a hurry to see a *yankee hung*, and left a bottle of wine for their rivals to drink?"

Editor bets "18 cents worth of bad whisky (even worse than they sell in Waynesboro) that [Alexander H.] Stephens will be [appointed] Postmaster at Crawfordville" by President Lincoln.

Editor declares: "The subscribers of the Gopher will have to wait until the holidays are over before they will be regaled with another issue, as the editor has a 'big drunk' in view. Look out for something large after the holidays."

The last number of the *Gopher*, dated December 29, 1860, contains a full-page cut "illustrating the Editor of the Gopher as he will appear on the road when his subscribers pay up." The cut represents a man in a two-wheeled vehicle drawn by a horse on the run. The editor states that "this is the last kick he'll make before

going into his winter quarters, not to make his appearance again until warm weather comes." And in conclusion he utters a kind of valedictory: "With the consolation that we have lived to some purpose, we will, with tears in our eyes, bid this vain world adieu. The brethren will all join in the following stanzas, omitting nary a verse, commencing

> 'I would not live always,
> I ask not to stay,' &c., &c."

The only humorous item of interest in this last number is "The Last 'Say' of the Major. Delivered at Gopherville the Night before the Election," referring to the election for delegates to the Secession Convention called to meet in Milledgeville, the state capital. The Major declaims, in his most august tones:

> "Our glorious Ship of State, like a bob-tailed gander, is floating down the current of time. . . . Rise up then like pokers in a tater patch and shake the deu drops off yer hunting shirts and fall into ranks. . . . Sound the tocsin! beat the drum! and blow the tin horn! till the startled echoes . . . shall reach the adamantine hills of New England . . . and the auriferous particles of Californy . . . prick up their ears, and in whispered accents enquire of her valors 'what's out!'. . . Elect me to the convention and I'll stick to you thro' thick and thin, like a lean tick to a nigger's chin!"

The *Gopher* was undoubtedly a wild venture that could cause nothing more than a ripple on the surface of Georgia literature, and it must be judged solely upon that basis. Its life was short, but it registered a desire for something more than the usual reading matter of the newspapers and of the bulk of literary periodicals belonging to that period. In its attempts to bring about the defeat of Douglas and Lincoln for the presidency, it may be considered as purely political propaganda, which passed into oblivion when the purpose for which it was founded had passed away.

# Fightin' Words

*By* JAMES HARVEY YOUNG

*James Harvey Young, A.B. (Knox College) '37, A.M. (Illinois) '38, Ph.D. (Illinois) '41, is Assistant Professor of History. Following his induction into the Army he amused his scanty leisure by looking into the etymology of military terms.*

MOST English words relating to things military have a Latin-French lineage. The Roman legions and the Roman home folks, in the days of the grandeur that was, coined the words that have passed on down to us, modified by time and circumstance, to form the backbone of our military vocabulary. In this respect the Romans far outdid the contemplative Greeks, who left their verbal heritage in the fields of philosophy and science.

In the late Middle Ages, France was a dominant military area on the march toward national statehood. Relations between France and England were close and anything but amicable. French was a language rooted firmly in Latin. English absorbed French words, including many from the military sphere in which the French were experts.

William the Conqueror crossed the Channel with his Norman-French cohorts to defeat the Anglo-Saxons at Hastings and to take over the rule of England. It was in 1066 and all that. Part of "all that" was *armor, siege, battle, turret,* and *fortress* in the English vocabulary. *Army* won out over three Anglo-Saxon words meaning about the same thing. The defeated Anglo-Saxons, having acknowledged the superiority of French fighting, were ready to grant the superiority of French fighting words.

In the late seventeenth century the French were approaching that epoch of military brilliance and disillusionment under the rule of the Sun-King, Louis XIV, builder of Versailles, lover of pageantry, both martial and otherwise. The English Stuarts, Charles II and James II, tried appeasement, and French prestige was high in English court circles. From this general period dates the transfer from French to English of *march, campaign, barricade, massacre.*

As late as World War I, French has stimulated the English vocabulary: witness *camouflage* and *barrage.*

English fighting words sailed to America on the "Mayflower" and other lesser-known craft. The American colonies set up *militia* (a Latin word, employed in its present meaning from the sixteenth century) on the English pattern, using the same titles of rank. Came the Revolution, and the Continental Congress, a month after appointing Washington commander of forces "for the defence of American liberty," on July 18, 1775, regularized the colonial militia. The Congress did not bother to coin new titles of rank.

Thus the *lieutenant,* both English and American, came into the language relatively early from the French words meaning "holding a place." A lieutenant was to take over the role of a superior officer during his absence. Incidentally, the Oxford *New English Dictionary* lists forty-odd different spellings of the word experimented with before the present form, and indeed the original French form, won out in usage. This eminent dictionary tries learnedly but admits defeat in explaining why the word in England is pronounced "left-tenant." The American pronunciation is much closer to the French sounds.

*Captain* is said to be the oldest military rank now in use. Like *capital* and *decapitate* it stems from the Latin *caput,* meaning "head." Back before the sixteenth century a captain held a far more important command than he does now. Our word *chieftain,* it might be added, developed from a French method of spelling *captain.*

As every schoolboy should know, *major* is pure Latin and means "bigger" or "greater." Just like *mayor* and *master.*

*Colonel* goes back through French and Italian to Latin, finding its origin in the same root that provides *colonnade* and *column.* A colonel was the head of a column of troops. Back along the long etymological trail the *l* in the middle was changed to an *r,* a fairly common consonantal shift. The close similarity between these two sounds is illustrated by the well-known fact that Chinese immigrants, whose native language contains neither sound, have a tough time learning to distinguish between them when they come to "Amelika." At any rate, *colonel* first came into English as *coronel,* some decades before the more historically correct form appeared. Then a two-front battle of words began. On the spelling front

*coronel* fought a losing battle and succumbed in England about 1630. It held out in America a century longer. On the pronunciation front, "kuh-nel" had many champions, including Dr. Samuel Johnson. But the common people insisted on saying "kernel." About 1820, five years after Waterloo, the purist scholars gave up. So—wear he eagles on his shoulders, or be he from Kentucky, he's a "kernel" now, even in Webster.

*General* was an adjective long before it was a noun. Until the end of the sixteenth century, it did not stand on its own feet but was used in the combination "general officers." At the dawn of its status as a noun it was applied to high military figures in both the Army and the Navy. Seventeenth-century England had "generals at sea." The Navy once had *corporals,* too, and, of course, still has *captains* and *lieutenants.* Conversely, the Army once had *ensigns,* or *ancients.*

A special word of attention should be bestowed upon the brigadier-general. The *brigadier* stems from an Italian verb that means to brawl or to fight. *Brigand* comes from the same root.

In the ranks of the enlisted men, the *sergeant* got into English, with the *lieutenant* and long before the *colonel,* in the days following William the Conqueror. The word had many uses, some of them in connection with feudalism, and almost fifty spellings, including *sergyaunte* and *ceriawnt.*

Webster notes that *corporal* goes back through the French to the same Latin word from which *captain* is derived. Thus etymologically two *chevrons* (borrowed from the French) equal two bars. The Oxford Dictionary disputes this lineage, preferring to believe that *corporal* derives from the Latin *corpus,* "body," instead of the Latin *caput,* "head." In 1579 an Englishman made the memorable distinction: "The Corporal is a degree in dignitie above the private souldior."

As to the *private?* It was applied to the English common soldier long before Shakespeare himself so used it (*2 Henry IV,* III, ii). It stems from the Latin, and one of its original definitions was "one who is not emperor, king, or prince." And that definition has never been disputed.

# Ship's Concert

*By* JAMES E. WARREN, JR.

*James E. Warren, Jr., A.B. '30, M.A. '41, is at present a sergeant of the Army Air Forces. He is widely known for his published verse, including the collected volume entitled* THIS SIDE OF BABYLON *(1938).*

Feathered with snow-foam, lovely, the Atlantic
Writhed past in marble ephemerally carven,
Heaving to blue beside us but farther away
Licking the cheap gray dinginess of distance
And fog-horizons.
Stirred by tingling mist,
Our fog horn grunted and grumbled low from slumber
Then twisted to dreams again.
Long floating there
Between two green and breathing worlds, I wondered
All the damp morning on the slanting deck
If past this pallid loneliness were lands
Worth more than loneliness. (The stupid faces
Turned easily into bitterness, sick sorrow
Cheapened by emptiness, and little hearts
That would not seem to grow). It was a mood
Which I had used before to wrap my heart in
When I had felt it was a fleshless thing
Worthy to roll in scented rags with beetles
Hatching their wistful prayers . . .
Then music came,
Simple and strong and beautiful and wise:
Brahm's *Wiegenlied,* I think; a waltz or two—
Strauss's perhaps, for they were soaked in wine;
And more things made anonymous by dreams
That mixed my mood with clay and reared a shore
Out of the shifting sea and mist—a shore
Of things that I had done and you had done—
A shore that told how we in glory had . . .

Stood talking on cold porches; leaned from windows;
Looked suddenly up from books or papers and smiled
For no clear reason; driven over country roads;
Waited in doorways from the raindrops; paused
In noisy hallways at the foot of stairs
To say half-words we need not have remembered;
And sat in windy swings; lain in warm grass;
Come down dim paths to meet; on tennis courts
Drunk of the sun so deeply and so long
We stumbled with a splendid weariness;
And walked at night in summer; heard at night
Schubert's great lion-music, *Rosamunde;*
Sibelius' sighing by his northern seas,

And whistled at themes we could not quite recall;
Rocked by a fire on chilly mornings; laughed;
Talked of old days more courteous than now . . .

The white ship rolled and leaned against the wind,
Tired of the slow desiring of the sea.
And I watched westward, longing for the land
Warm to the flesh and sweet to nerve and blood
(Hillsides to scramble up and dust to touch
And voices still to love in spite of pain),
The sea being brief and empty as a sleep,
And all the world being wonderful with song.

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## The Waning Year

*By* ANDERSON M. SCRUGGS

What instinct abides in the mind, far wiser than reason,
That senses earth's consummate beauty in these days
When birds turn south again for a phantom season
Somewhere under vertical suns,—when down the haze
Of the late woodland dusk the leaves seek, one by one,
The silence of wintry sleep? What ghost in the brain
Awakes with the splendour of summer spent and done,—
With the stricken and desolate weed, the slow-falling rain?

If death comes thus to leaf and vine and flower,
With a beauty no poem or song shall ever convey,
Shall not men pass like these in their final hour?
Shall not the flesh too find, some distant day,
In the stillness of dust and time, when the pulses cease,
Its dark ineffable dream, its ultimate peace?

# Studies of the Flora of the Granite Outcrops of Georgia

*By* WOOLFORD B. BAKER

*Woolford B. Baker, A.B. (Henderson-Brown College) '13, M.S. '20, Ph.D. (Columbia) '26, is Professor of Biology. Widely recognized as an authority on the flora of Georgia, Professor Baker has especially won the gratitude of the University for the large part he has taken in conserving and enhancing the natural beauty of the Emory campus.*

ONE OF the most interesting characteristics of plants is their ability to adjust themselves to a wide variety of environmental conditions. Through the processes of organic evolution, those plants which survive in a particular environment over a long period of time show special structural modifications and peculiar physiological behavior which reflect the conditions under which they live. Thus one finds rather definite associations of characteristic plants living together and competing for existence in a relatively fixed environment. The more rigid and selective the environment, the more limited the number of plants which can become permanently established in these associations. When successful adaptations have been finally effected, the plants making them are seldom found in any other habitat and are then classed as endemics.

The study of endemics of a given area proves to be very interesting and frequently yields valuable information as to genetic origins and relationships. The cytologist, or student of cells, is particularly concerned with such problems, since chromosomes are believed to be the chief agents in a cell responsible for the development of the characters of organisms, and since genetic relationships can best be determined by a detailed comparative study of chromosomes and their behavior.

Some of the most striking examples of plant endemism to be found in the Southeast are those associated with the granite outcrops of the Piedmont region of Georgia. This zone, roughly one hundred miles wide and including all of forty-three counties and parts of fourteen others, occupies approximately one-third of the

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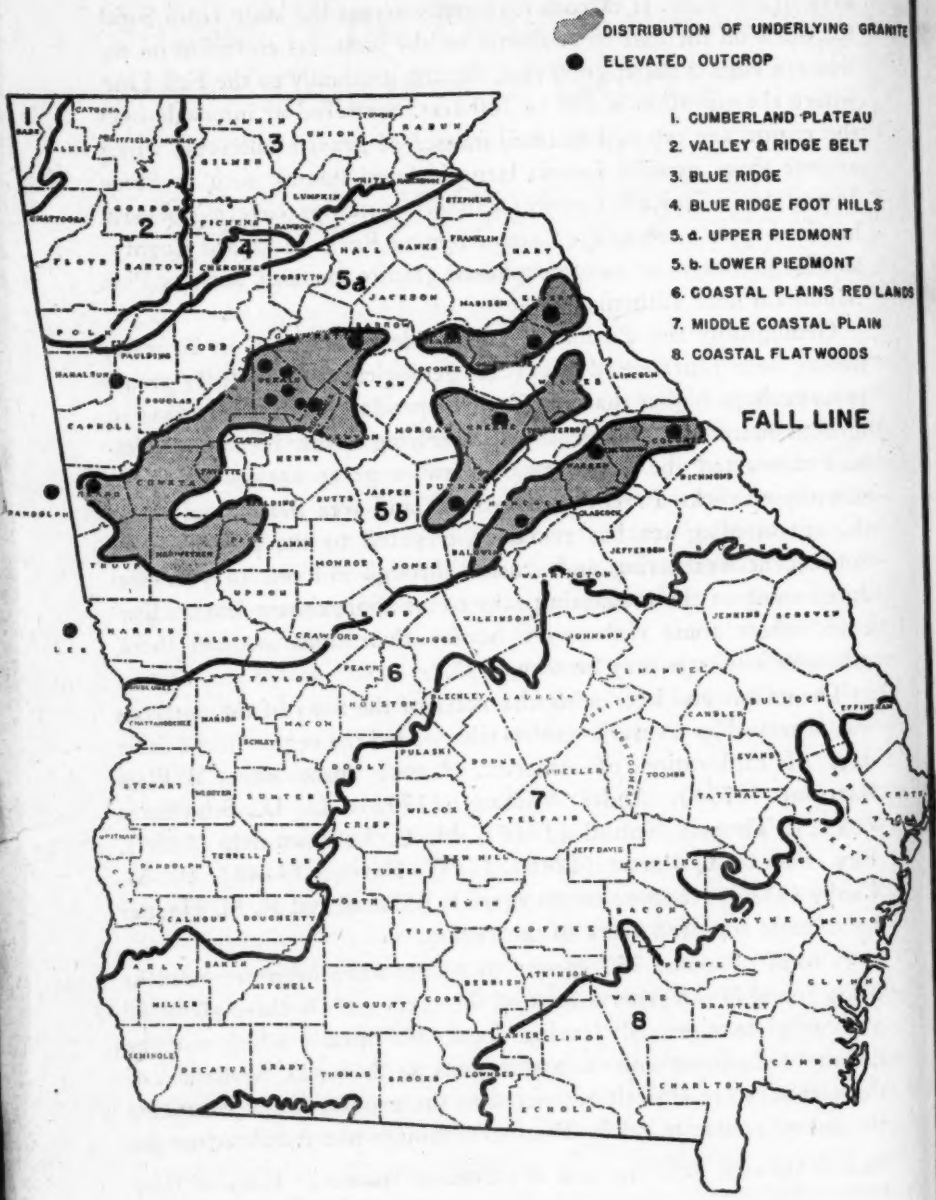
area of the state. It extends diagonally across the state from South Carolina on the east to Alabama on the west. Its elevation on the western edge is about 1000 feet, sloping gradually to the Fall Line, where the elevation is 250 to 300 feet. Scattered at intervals over the region are exposed residual masses of granite outcrops, which assume three general forms: large isolated domes, such as Stone Mountain in DeKalb County; flat-rock outcrops covering several hundred acres, such as the Camp Meeting Rocks in Heard County; and large masses of metamorphosed granite gneisses, such as Pine Mountain near Lithonia.

Geologically the Piedmont is the oldest land area in Georgia, having been represented in earliest geological time by lofty mountains perhaps higher than the Rockies, produced by the intrusion of igneous materials underneath the overlying rocks. Heat and pressure converted the upper masses into a great variety of metamorphosed rocks. Practically all of the land area thus raised above the surrounding sea has remained elevated to the present time. Subsequent weathering and erosion through millions of years reduced most of the mountain peaks to an approximate level. However, where some rocks were harder than those around them, extensive outcrops may be seen.

The unique and interesting character of the flora of the outcrops was observed by several botanists who visited the region in the early days of exploration of America. Among these were William Bartram (1776), André Michaux (1795), L. D. Schweinitz (1812), Thomas Nuttall (1816), M. C. Leavenworth (1836), Rev. Thomas C. Porter (1846), H. W. Ravenel (1848), W. M. Canby (1869). In more recent years J. K. Small and R. M. Harper have made repeated visits to the region.

A total of about 250 species of plants have been recorded as being found in the general area of the outcrops. Of these about 50 are casual immigrants,[1] leaving about 200 species which may be definitely identified with the associations on the rocks. Seventeen of these species are entirely restricted to the exposures and constitute the list of endemics, while 27 others, though not restricted to the

[1] Rogers McVaugh, "The Vegetation of the Granite Flat-Rocks," *Ecological Monographs*, VIII, 2 (1943).


DISTRIBUTION OF UNDERLYING GRANITE
ELEVATED OUTCROP
1. CUMBERLAND PLATEAU
2. VALLEY & RIDGE BELT
3. BLUE RIDGE
4. BLUE RIDGE FOOT HILLS
5. a. UPPER PIEDMONT
5. b. LOWER PIEDMONT
6. COASTAL PLAINS RED LANDS
7. MIDDLE COASTAL PLAIN
8. COASTAL FLATWOODS
FALL LINE

rocks find optimum conditions there. A detailed study of the endemics and their most characteristic associates was chosen by the author in 1933 as the subject matter for a graduate program at Emory University which has been continued at intervals to the present. A total of eight Master's theses have been assigned to and completed by graduate students as parts of the more comprehensive program.[2]

A visitor to one of the major outcrops, such as Stone Mountain, sees spread before him a veritable panorama of interesting plants throughout the year.

In midwinter there are few conspicuous plants to be seen, but there is a sort of grandeur to the bare gray granite mass, which rises more than 600 feet above the general level of the surrounding plateau. Dark patches of rock moss, *Grimmia,* growing among the more widspread grayish-green lichens, with here and there a mat of tiny green mosses, make up the bulk of the vegetation. The most characteristic habitats of the bare rock surface can be seen more clearly at this season than at any other time. These are shallow depressions, or weather pits, of varying size, ranging from a few feet in diameter on Stone Mountain to as large as 150 feet in length by 15 feet in width on some of the flat outcrops. In each of the pits there is usually a thin layer of loose soil in which seeds of several endemics lie dormant, ready to renew activity when the temperature rises and sufficient water accumulates. The pits are so shallow, few being more than six inches depth, that sufficient water to support plant growth remains for any length of time only during

[2] Theses Completed as Parts of the Research Program: 1. 1933—Survey of the Flora of Stone Mountain, Mattie Lou McCullough Smith; 2. 1937—Studies in the Life Cycle of *Diamorpha Cymosa,* James McCranie; 3. 1937—Studies in the Life Cycle of *Isoetes Melanospora,* Martha Johnson; 4. 1938—Studies in the Life Cycle of *Sabulina Brevifolia,* Mary Stipe Eyles; 5. 1938—Studies in the Life Cycle of *Amphianthus Pusillus,* Dorothy Lunsford Giles; 6. 1939—Studies in the Life Cycle of *Arisaema Triphyllum,* Gus Napier; 7. 1940—Survey of the Flora of Mount Panola, Gene Matthews Darlington; 8. 1941—Studies in the Life Cycle of *Gelsemium Sempervirens,* Virginia Speer.

The projected program includes completion of surveys of the flora of the remaining outcrops, with special reference to seasonal incidence and ecological associations, as well as a comparison of the vegetation of the different outcrops. Cytological analysis of each of the endemics is being made, with special reference to variations, speciation, and cytogenetic relationships. Detailed studies of the life cycles of the remaining endemics and their more characteristic associates will be completed, with emphasis on the structural changes which enable them to make their adjustments to such restricted areas.

the rainy season. Even though they are filled by summer rains, the water soon evaporates, leaving the soil desert-dry. In many of the pits, particularly those on the slope of the mountain, one edge is frequently worn away, so that only enough water remains after a rain to wet the soil; hence if seeds are to germinate and plants reach maturity, they must do so during the rainy season. In such an environment, one of the most abundant plants to be found during the winter and early spring, has become adapted. This is *Diamorpha cymosa,* a relative of the sedums. It may be found in such profusion from midwinter until April as to form a veritable carpet of green to red.

The seeds of *Diamorpha* germinate with the first fall and winter rains, and young seedlings appear in abundance in late November. The embryonic leaves are green at first but later become red, perhaps as an adaptation to the peculiar conditions found on the mountain, since plants grown in the greenhouse do not develop the red pigment.

*Diamorpha* develops to maturity only in shallow soil; hence it is found typically around the margins of practically every weather pit, as well as over the entire area of those pits whose margins have eroded and thus do not retain water. In addition the plant is widely distributed over the surface of the granite where sufficient soil has accumulated to give it root attachment and hold moisture long enough for its cycle to be completed.[3]

*Diamorpha cymosa* ranges in height from one and a half to three inches, has turgid, fleshy leaves which contain large quantities of water. The parts of the flowers occur in fours; the petals are white, but since the ovaries, stems, and leaves are tinged with red, the general appearance of the masses of plants when in bloom is like that of a pink carpet. Since this plant grows to maturity in shallow soil only, the depressions containing more than four inches of soil are bordered with a pink mat, while the center is occupied by other species, particularly *Sabulina brevifolia,* a small plant bearing white flowers related to the pinks, and a tall yellow composite, *Senecio tomentosa.* A characteristic sedge, a few species of grass, and occas-

[3]James McCranie, *Studies in the Life Cycle of Diamorpha,* 1938.

ionally a rock saxifrage are associated with *Sabulina.* Where the soil is deeper and retains moisture for a longer period of time, two members of the lily family, *Erythronium americanum,* or trout lily, and *Oxytria croceum* are found.

In May the *Diamorphas* have matured and can be recognized only by the masses of dry stalks and seed pods. The pink carpets now change to white, since the delicate flowers of *Sabulina* remain open until late May and June.

*Sabulina,* whose delicate flowers and slender branching stems resemble those of its garden relative, baby's breath, *Gypsophila,* has made its adaptation to the mountain habitat in a very interesting manner. It reaches full flower and fruit before the end of the spring rainy season and sheds its myriads of tiny seeds into relatively dry soil. Here they must lie dormant through the hot summer months to be ready for germination when rains come again in the fall and early winter. Attempts to germinate seeds collected during the summer have been consistently unsuccessful even after pretreatment.[4] Those collected between November 1st and March, however, germinated readily under laboratory conditions even without any pretreatment. Not only do the seeds benefit by the arid conditions of summer, but the fact that they lie dormant during that period prevents their germination after occasional showers, when the subsequent evaporation of moisture would not leave enough for them to come to complete maturity.

The entire mountain changes appearance during the summer. After the spring vegetation has matured, the soil becomes dry and an entirely new group of plants come into flower. A few of these are endemics, but many of them are to be found elsewhere in similar habitats.

The stiff, dry, reddish stalks and seed pods of *Diamorpha* mark the location of plots occupied by the spring flowers, but on the whole it seems as if some expert gardener had reworked the old beds, discarded some, rearranged others, and made new plantings for summer display. Chief among the new species are the brilliant yellow flowers of *Coreopsis,* the delicate purple blossoms of the fleshy-

[4] Mary Stipe Eyles, *Studies in the Life Cycle of Sabulina,* 1938.

leaved *Talinum,* a relative of our garden portulaccas, a few scattered deer flowers, *Rhexia virginica,* clumps of spiderworts, *Tradescantia,* a few scattered milkworts, *Polygala,* and masses of pink primroses. Cactus plants are to be seen here and there, and in combination with the tall spikes of *Yucca,* or bear grass, suggest a genuine desert environment. The stunted, weather-scarred junipers and pines growing out of crevices and rubble heaps give ample evidence of the scarcity of water throughout the year.

By fall the scene changes, and from a distance the mountain appears as a gigantic golden dome because of the widspread blossoms of one of the most characteristic plants of the season. This is a relative of the sunflowers, *Viguiera porteri* (*Gymnolomia porteri*), whose stems and leaves have been developing from early spring, but which comes to full flower when conditions are most adverse for the majority of its associates. A member of the *Euphorbia* family, the scurfy *Crotonopsis,* is almost as abundant as the *Viguiera,* but being smaller and rather insignificant looking, escapes the notice of the casual observer. A few tall plants of blazing star, *Liatris,* may be seen flaunting their rose-red flowers among the beds of *Viguiera.*

With the coming of the first frosts and the fall rains the scene changes again, and all available soil seems to be replanted. The weather pits particularly begin to show indications of preparation for the spring season.

An insignificant relative of the ferns, *Isoetes melanospora,* a quillwort, is one of the first to begin activity in the pits whose margins are unimpaired so as to retain water for a considerable length of time. This plant is found in three or four pits near the top of Stone Mountain, but is widely distributed on Mount Arabia near Lithonia. Material was secured from the latter location in 1937 for detailed study.

*Isoetes melanospora* begins its growth in the late fall,[5] as soon as the pits are filled with water. In 1937, for example, the depressions on Mount Arabia were dry as dust in September. The first fall rains came on the 10th of October, and from that date until May 1938, water was constantly present in variable quantities in the largest

[5] Martha Johnson, *Studies in the Life Cycle of Isoetes Melanospora,* 1937.

pits. Four days after the pools were filled in October, a fairly abundant growth of *Isoetes* appeared and continued to be present until May. During December the water in the pools was frozen solid, but the leaves of *Isoetes* remained green. In January the ice melted for a few days and growth was resumed. During March the plants grew very rapidly, attaining their maximum growth by the first of May, when spores were matured and shed. There was scant rainfall during April, and by May 11th all water had evaporated. The leaves of the plants turned brown, died, and soon disintegrated, leaving little evidence that living plants were ever present.

The underground stem or rhizomorph of *Isoetes* is perennial, however, and dry soil containing the parts, when brought to the laboratory and placed under water, disclosed renewed growth on numbers of them. These rhizomorphs are able to endure long periods of drought during the summer, but are ready to begin renewed growth with the first fall rains, or when placed in water in the laboratory.

The non-technical visitor feels poorly repaid for his efforts to observe the plants when, after a long climb up the mountain, he finds such a rare and interesting specimen to be so insignificant looking.

Perhaps the rarest and in many respects the most interesting of the endemics of the outcrops is *Amphianthus pusillus*, a seed plant belonging to the family *Scrophulariaceae*. It is found closely associated with *Isoetes* both as to location and seasonal development. It is limited entirely to those weather pits which retain water for a long period of time, and may be found beginning its cycle in early winter after the pits have been filled by the fall rains. Specimens have been taken from three small pits near the summit of Stone Mountain for many years, the first photographic record in our possession being dated March 1930. During years of scant rainfall the plants are rather rare in the smaller pits, but in the larger ones, such as occur on the summit of Mount Arabia, they have appeared in abundance every spring.

Detailed study of *Amphianthus* was made during the season 1938-39[6] from material collected on Mount Arabia. It is a rather

[6] Dorothy Lunsford Giles, *Studies in the Life Cycle of Amphianthus Pusillus*, 1938.

minute plant with a short stem about a quarter of an inch in length, bearing a cluster of fibrous roots at the base and a crown of small, oblong, linear, sessile leaves at the tip. As the number of leaves increases, they frequently become grouped in two or three clusters or tufts. Two or three small basal flowers attached to short pedicels arise among the tufts. Because of their position, these flowers are constantly submerged.

From the summit of the stem slender, thread-like, red-tinged scapes or pedicels, one to five centimeters in length, develop among the clusters of basal leaves and extend to the surface of the water covering the plants. The length of the pedicel depends upon the depth of water. At the tip of each such pedicel two sessile, leaf-like bracts are developed, which seem to act as floats to support a single small flower borne between them. The bud for this flower first appears early in winter, remains more or less quiescent during the colder months, and expands quite rapidly with any rise in temperature. For example, the first pair of bracts were observed by Lunsford to be developing under water on December 15, 1938, but did not reach the surface of the water until January 8, 1939. During midwinter the pools were frozen over to a depth of half an inch or more, often embedding the floating bracts in the ice film. So far as could be determined from prepared sections of this frozen material, the tissues were not injured, although cell divisions were stopped. No open flowers from floating buds were found until February 26, 1939. The maximum blooming period occurred during the second and third weeks of March in 1938 and 1939. Lunsford concluded that "the growth and flowering period of the plant in its natural habitat appears in most cases to be terminated by the water relationship."

Perhaps none of the endemics shows more marked structural and functional adaptations to the rigid conditions found on the outcrops than does *Amphianthus*. Its stems and leaves possess large air spaces and rather poorly developed conductive tissue; stomata are few on the lower surfaces of leaves but abundant on the upper; seeds are able to survive for many months, perhaps years, but germinate readily when the pits become filled with water; and finally, the fact that both submerged and floating flowers occur, enables the plant

to take advantage of both aquatic and aerial conditions. A comparison of the two types of flowers and their fruits shows the significance of this particular adaptation.

Basal flowers are continuously immersed as long as water remains in the pools. Careful study shows that they are normal in every particular, and both ovules and pollen grains are developed. The petals do not open under water however; consequently pollination is assured. If the basal flowers are exposed to the air, they open normally, and except for the absence of a slight purplish pigment are quite similar to the floating flowers. The capsules produced by the submerged flowers are slightly larger than those of the floating ones, and more seeds are produced by them. As the capsules develop, their pedicels curve downward, and either push the capsules into the soil or quite close to it where the seeds are shed.

The floating flowers are continuously exposed to the air, open as soon as mature, and form seed capsules just as do the basal ones. It is possible that these are cross-pollinated either by insects or by pollen carried from one to another by water; thus whatever vigor there might be from hybridization is accomplished. The capsules are smaller than those of the basal flowers and contain fewer seeds. Their pedicels curve downward, so that seeds are shed directly into the water. After the seeds are shed, the parent plants begin to disintegrate, and by the time the pools become dry, little if any evidence is seen of their having been present.

Thus one may find in this rather limited area of Georgia, readily accessible natural gardens in which occur some of our rarest and most interesting plants. Each season presents a different picture, and in order to understand and appreciate the full significance of the changing panorama, one must visit the outcrops several times during the year. If the cycle of any one of the endemics is observed throughout the year, the visitor is amply repaid for his effort, and is impressed with the fact that living organisms have an almost unlimited capacity for adapting themselves to rigid environmental conditions.

# The Labor Victory in England

*By* CULLEN B. GOSNELL

*Cullen B. Gosnell, A.B. (Wofford) '16, A.M. (Vanderbilt) '20, Ph.D. (Princeton) '28, Professor of Political Science, is on leave from the University and teaching in the Army University Center at Shrivenham, England, near Oxford. A trained political observer, Professor Gosnell wrote the following report a month after the general elections which retired Winston Churchill from the English Prime Ministry and gave power to Clement Attlee's Labor Government.*

THE LABOR PARTY came through with a smashing victory in the English general elections on July 5. This was a great surprise, not only to the Conservatives, but to Labor as well. The Deputy Mayor and also a former Mayor of Bath recently expressed deep concern to the writer about Churchill's downfall, and a trainman, while jubilant over victory, was nevertheless a bit dazed at the overwhelming gains. It may be that Labor only hoped for a sufficient gain in the Commons to be able to checkmate the Government. These people were still much concerned about victory over Japan and did not expect to topple Churchill at this time. If I sense sentiment correctly, that is the way things stood.

According to the London *Times* of August 3, the following is the new line-up in the House of Commons:

The Government—Labor 392, Liberal 12, Independent Labor Party 3, Communist 2, Commonwealth 1, Irish National 2. Total 412.

The Opposition—Conservative 189, Ulster Unionist 9, National 2, Liberal National 13. Total 213.

Independents 14.

The grand total is 639; so one seat is not accounted for, as the membership of the Commons is 640.

The total popular vote was about 25,000,000 and Labor received around half of the total. Some Conservatives are insisting that Labor could not have won had the Liberals not split the vote, but actually the Liberals only polled about 2,000,000 votes. The Liberal Party seems to be fading out of the picture.

The Universities seem to be either in the Opposition or at most Independent. The Scottish Universities, with three seats in the Commons, returned one Nationalist, one Conservative, and one Independent; the Labor candidate received only about half as many votes as the lowest man among the victors.

University men, however, play a large role in the Labor Government. The noted political scientist, Harold Laski of the London School of Political Science and Economics, is Chairman of the National Executive Committee of the Labor Party. Rumor has it that Laski will be elevated (or demoted) to the House of Lords. Possibly the strategy here is to "shut him up," as he is considered a radical. Professor Noel-Baker of the University of London is to be a minister.

The sweeping victory was due to an accumulation of things. The Conservatives had been in power for eight years, as there was no election during the war. Normally the tenure of a Parliament cannot exceed five years, but in wartime its life is always extended. In America we do not dispense with elections as prescribed by the Constitution, but in England the Parliament is legally the sovereign and can change the English Constitution at will.

The Conservatives were identified with appeasement before the war, and this landslide was the result of the pent-up feelings of the people. Churchill made the political mistake of standing on the record of his party, and his party had many deadweights hanging to it. All people pay great tribute to him as a war leader, but they hardly regard him as fit for the postwar years and peace.

Several newspapers are hailing Labor's triumph as a great victory for the common man. Henry Wallace's address of the spring of 1942 is being quoted widely. It is believed that the common man at last is to have his day.

Even though returns from the Universities show that either Independents or Opposition candidates from these constituencies were generally returned, this is not an indication that the Universities are conservative or moderate. My guess is that the intellectuals are largely in the ranks of Labor, for the Labor Party appeals to those who work with their brains as well as to those who work with their

hands. University constituencies include graduates as well as professors.

In some quarters radical and sweeping changes are being predicted as to British foreign policy. One example is the following editorial from the London *News Chronicle:*

### Why It Happened

"Labour's victory is regarded as a defeat for Conservatism all over Europe." That comment from Switzerland seems to us to express the whole point of the Election with beautiful simplicity.

The electors were not turning aside in war-weariness from the high purposes which had sustained them for six bitter years. Far from it. The sweep to the Left was the natural outcome of the national reawakening of 1940.

The British people rose magnificently to all the calls made upon them by the war because they were inspired by a passion for freedom and by a resolve to create for themselves a better world than they had known in 1939. Amid all the perils of the struggle they were united as never before by this common ideal.

The Election showed the determination of the people to carry forward into peace the spirit that had transformed Britain during the war. In casting their votes they were striving to make a reality of the democracy for which they had so bravely fought. The Election was a conscious effort to achieve their war aims.

Mr. Churchill's insistence on identifying himself with a discredited Toryism was a tragic error. The people voted as they did, not to disavow the national leader of 1940-45, but to rid themselves of the shackles of an out-of-date Conservatism. This will be increasingly realized abroad once the shock of the change has passed.

The Election and the new Government which it has brought into being are signals of hope from the British people to the world. They will bring good cheer amid the perplexities of the post-war period to those democratic forces that are everywhere struggling to throw off rusty fetters and outworn despotisms. A new confidence and a fresh impulse will quicken the Continental forces working towards a free and progressive society.

The defeat which Conservatism has sustained in this country



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will not bring us a new Jerusalem over night, but it provides a grand chance for a new start in home and foreign affairs. Best of all, it represents Britain taking her traditional role as leader in "the forward march of the common people in all the lands towards their just and true inheritance, and towards the broader and fuller age."

Whether the domestic policies will vary considerably from those of the old government is a matter for conjecture. It must be remembered that Churchill's government went a long way in nationalizing coal, and it might have gone further and nationalized the coal mines had it been returned to power. The way it regulated the Bank of England was not much less radical than what the Labor Government proposes to do. And the Churchill government was headed in the same direction on housing, health, and social security. They undoubtedly would have put the Beveridge Plan into effect.

Churchill courted Franco, but the Labor Government will not support this stand. Franco will undoubtedly pass out of the picture now.

Russia will feel more friendly toward the new Government. The Conservatives sold the Russians down the river before the war and pulled every string to get Hitler to attack them. This Stalin could never forgive. The slate is now wiped clean.

The new Government will be made up of "old" men and "old" women. Only one or two in the Cabinet are under fifty years of age. The average age is sixty-one. In the list are former taxi drivers, farmers, university professors and school teachers, and so on. One lady cabineteer is the daughter of a textile operative.

Already a five-year program is being projected. High on the list is housing; health, education, and public works follow. Nationalization of railways and rivers is almost certain to be effected.

The Labor Party is in for a hard time, in my opinion. It is on the spot. The victory was due largely to resentment, and if the Government does not get quick results the people will be disappointed. Like the voters in America, the English people sometimes vote on negatives and not on positives. They vote against certain leaders and not so much for the victory. If the Government works

hard and goes down the line for the people, it may remain in power for some years; on the other hand, its tenure may be very short. In some quarters I am told that the new Prime Minister does not have the "political know how." Certainly a leader must be a shrewd politician to succeed. Good examples are F. D. R. and Churchill. Labor has its chance and has a strong mandate from the people. If it is temperate, it may continue to gain supporters.

## A Note on the Frontispiece

Some months before the opening of the Wesley Memorial Hospital on the Emory University campus, a resolution was presented by the medical faculty of the University paying tribute to Mr. Asa Candler for his services to medical education, including large gifts to the Hospital. In the same resolution the Atlanta philanthropist was requested to permit a life-sized portrait of himself to be painted so that it might be permanently displayed in the entrance hall of the Hospital. Mr. Candler consenting, a committee consisting of Dr. W. K. Goldsmith, Dr. F. K. Boland, Dr. F. P. Calhoun, Treasurer, and Dr. S. R. Roberts, Chairman, solicited funds from the medical faculty and secured an artist for the portrait. The artist chosen was Charles Frederick Naegele (1857-1944), who painted the portrait in his studio near Marietta. The painting was unveiled on May 8, 1923, with formal ceremonies, Dr. Calhoun presiding and Dr. Roberts making the presentation. The portrait was pronounced to be an exceptional likeness. On his visits to the artist's studio-home Mr. Candler had expressed his admiration of the view to the northwest. Mr. Naegele, therefore, painted this view as a background to the standing figure. To the left in the distance are seen Kennesaw and Little Kennesaw Mountains and to the right Black Jack Mountain. In the foreground russet hues prevail; the horizon is misty blue, from which white clouds rise steeply to the darker blue of the sky overhead. The canvas is the largest in the possession of the University, dominating the entrance hall of the Emory University Hospital, as its donors intended it should.

# The Role of the Vitamins in Nutrition

*By* GEORGE T. LEWIS

*George T. Lewis, B.S. (Middlebury College) '22, Ph.D. (Michigan) '27, is Associate Professor of Biochemistry in the School of Medicine and Chairman of the Department. Since 1942 he has been engaged in research in the field of the vitamins. Members of the departmental staff who have also participated in this project are Dr. Evangeline Papageorge and Dr. Virginia Feder. Technical assistance has been rendered by Margaret Smith, Margaret Lamar, Theodore Varner, Marjorie Day, Margaret Holroyd, and Lou Ada Murphy. Professor Lewis's article will be published in two parts, the second part to be printed in the December* QUARTERLY.

THE INTEREST of the general public has been keenly aroused in the relatively new science of nutrition by continuous newspaper and radio publicity. It is extremely difficult for the layman to know from the mass of current material in the press and on the radio what is based on fact and what is propaganda of one type or another. The following pages will attempt to set forth from the viewpoint of the scientific laboratory, the generally-accepted knowledge concerning one branch of the science of nutrition, that of the vitamins. We have been particularly interested in this topic and, as a portion of our research program, have been actively engaged in attempts to add to the sum of knowledge of certain of the vitamins.

What are vitamins? How did the term originate? How have we obtained our knowledge concerning them? It has been known for more than two centuries that certain disease states are caused by inadequacies of diet. The first recorded statement of such a deficiency disease was written about scurvy in 1720. Beri-beri, primarily an oriental disease, and rickets, a much more recent development resulting from crowded living conditions in large cities, also belong in this category. In this connection it is interesting to point out the slowness with which knowledge is accumulated. Although scurvy was described in 1720, it was not until 1932 that the material active in the prevention and cure of this deficiency disease was isolated as

a pure chemical substance. Since that achievement, progress has been made at a relatively rapid rate.

However, by no means have all of our ideas concerning the vitamins come from the study of disease states such as scurvy. As early as 1888 men of science became interested in attempts to maintain laboratory animals, such as albino rats, on diets made up solely of carbohydrates, fats, proteins, and salts, and of proven purity. The failure of these experiments led to the conclusion that "a natural food such as milk must therefore contain besides these known principal ingredients small quantities of other and unknown substances essential to life." As we shall see presently, this is a direct forerunner of our current definition of a vitamin.

From the recognition of disease states known to be caused by poor diet, and from the experiments of laboratory men attempting to provide normal nutrition for animals with diets made up of pure chemicals, came the realization that the food supply of men and lower animals must provide materials other than the time-honored carbohydrates, fats, proteins, salts, and water, if health is to be maintained. These additional substances have been called accessory food factors, or vitamins, and the definition of a vitamin is "an organic substance which must be present in small amounts in the diet to ensure normal health."

The designation "vitamin" arose in the following manner. In 1912, Casimir Funk, a Polish investigator working at the time in London, was attempting to isolate from the material removed from rice during the manufacturing process which produces the commercial white rice, the chemical compound responsible for the cure and prevention of the deficiency disease beri-beri. (It had been shown by a Dutch physician in Java in 1898 that the whole rice kernel was capable of preventing or curing a similar condition which develops in chickens.) One of the compounds which Funk isolated during his work on rice polishings, belonged to a class which the chemist knows as amines. Believing this to be the sought-for anti-beri-beri compound, he designated it a vital amine, or vitamine. Further work soon showed that Funk's compound was not the agent active in connection with beri-beri. However, the name had become established, and gradually came to be used also to designate other com-

pounds belonging to the same general category. The only change has been the dropping of the final "e" in deference to the chemists, since of all the long list of vitamins only two or three are amines, chemically speaking.

Two additional facts are interesting in connection with Dr. Funk's work. Another of the compounds which he isolated from rice polishings was nicotinic acid. This he discarded as having no activity in the particular disease state which he was studying. Some twenty years later it was shown to be the material concerned with the deficiency disease pellagra which has been widely prevalent in our own Southern states. How much greater fame Dr. Funk might have won if he had realized this! He is still an active investigator, working currently in New York.

After the collective term "vitamin" had been adopted for these dietary essentials, the next step was to designate the individual members of the group. It was not at first realized that there were more than two of these factors, and for want of a more exact name, since the structure was entirely unknown, they were called fat-soluble A and water-soluble B. This nomenclature was proposed by Dr. E. V. McCollum, who at that time was working at the University of Wisconsin. When other vitamins were found, the alphabetical designation was continued and we have vitamins A, B, C, D,—L, P, etc. Subsequent findings that vitamin B consists of several components led to their designation as $B_1$, $B_2$, $B_3$, etc. It should be pointed out that there is a tendency to designate a particular vitamin by its chemical name when it has been isolated as a chemically pure substance.

As the definition stated, the vitamins are present in most natural sources in a very low concentration. Therefore, the problem of determining how much of a given vitamin is actually present in a food material or body fluid or tissue has been a difficult one. As long as a vitamin is merely an unknown substance with the designation of vitamin M or some other letter, the only way to analyze for it is by the use of its physiological activity. This has led to the development of a type of analysis known as bioassay. A diet is prepared which is deficient in the vitamin in question but complete in all other respects. To this diet are added graded amounts of the ma-

terial to be analyzed, and the behavior of a group of animals to which the diet is fed is observed. Or, the deficient diet is fed, and after symptoms of deficiency are seen in the experimental animals, varying amounts of the material in question are added to the diet of small groups of animals and the curative action is observed. Bioassays are long and tedious and involve the upkeep of a large and expensive animal colony. Also, because of individual variations among animals, the results are never very clear-cut. The results of bioassays are expressed in International Units. Such a unit is fixed by international agreement and is different for each vitamin. If there were no other, this would be a strong incentive to find the chemical structure of each vitamin subsequent to its isolation, because only then can a search be made for a specific analytical method for that particular compound. There is still, of course, the problem of separating small amounts of vitamin from a large amount of other material before a chemical reaction can be applied.

Let us now take up the individual vitamins in turn and attempt to state the present status of our knowledge of each, the amount the diet should contain, and the best source of supply.

Vitamin A is soluble in fats and therefore will be found associated with the fatty components of the diet. It has been isolated in pure form but its preparation by laboratory reaction has not been brought about. For this reason, the commercial products are concentrates prepared from natural sources. The concentration is effected by a very interesting application of distillation in a high vacuum. The source is the liver oil of various species of fish. Distillation results in several fractions, one of which contains practically all the vitamin A present. Because fishing has been greatly interfered with by the war, the supply of vitamin A is inadequate to meet all demands, and the amount available has for some time been under allocation by an agency of the Federal Government.

If animals such as albino rats are fed a diet deficient in vitamin A, a characteristic group of deficiency symptoms ensue after an interval which may be several weeks in length. This interval is proof of the statement that vitamin A is stored in the body, principally in the liver. When the symptoms appear, they are in order of appearance, night blindness (inability to see in dim light or to readily adjust

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to a change from a bright to a dim light), xerophthalmia (an infection of the mucous membrane lining the inner surface of the eyelid), upper respiratory infections, and stones in the urinary tract. The relation between vitamin A and eye function is known to exist in human nutrition, and is the basis for the ingestion of large amounts of the vitamin or its precursor (to be discussed presently) by airplane pilots and men anxious to pass physical examinations for the armed services. It has unfortunately not been found possible either to reduce the number or severity of upper respiratory infections, such as the common cold and sinus infection, by increasing the vitamin A intake, or clearly to demonstrate that these troubles are due to a vitamin A deficiency. One is not able to assure John Doe, his wife or children, that if they take more vitamin A they will have fewer colds or difficulties with sinuses. An adequate supply may have some beneficial influence on the severity of these conditions, but certainly the widespread incidence of colds has not been proved to be the result of a low vitamin A intake.

A somewhat similar situation exists with regard to the influence of vitamin A on the incidence of kidney stones. Some investigators believe that there is a direct relationship, as experiments with rats would indicate. This is not, however, generally accepted.

A direct connection has been shown to exist between vitamin A and a group of naturally-occurring yellow pigments known as carotenes. The name is indicative of the fact that the pigment of carrots belongs to this group. The liver contains a mechanism for the transformation of carotene into vitamin A, and hence if the diet contains adequate amounts of the pigment, the actual vitamin is not necessary. Like all other physiological functions, this transformation mechanism may not act normally, in which case the individual must ingest the vitamin itself. Some instances of this type have been described.

The amount of vitamin A advocated to ensure an adequate supply is 5000 International Units daily and the best source is the fish-liver oils.

Vitamin B at first represented the water-soluble food beyond the usual carbohydrate, fat, and protein. When it was realized that the factor active in scurvy was different from that concerned in

beri-beri, vitamin C, the antiscorbutic principle, became a distinct entity, and vitamin B was left as a second water-soluble material. It was subsequently found that a deficiency in vitamin B was the cause of a variety of pathological symptoms or states: beri-beri, cheilosis (inflammation at the junction of mucous membrane and epidermis, such as at the corners of the mouth and the openings of the nostrils), pellagra, failure of yeast growth, lack of pigmentation of the fur of animals, etc. Further investigation showed a different vitamin to be concerned in each of these conditions and therefore vitamin B to be a mixture of several compounds. These have been designated by subscripts $B_1$, $B_2$, $B_3$, etc. The most recent member of the group is $B_{11}$, and the term B-complex is used for the mixture of all which was originally simply B.

It is in connection with some of the members of the B-complex that the Emory group has been carrying out experiments during the last two and a half years. This work has been mostly concerned with vitamins $B_1$ and $B_2$, or to give them the names which are attached to them as known chemical compounds, thiamin and riboflavin. This work was materially assisted in the beginning by Drs. Park McGinty and Philip Nippert and received the active support of Dr. Herbert Alden. It was at first aided financially by the Nutrition Foundation, Inc., and more recently by the McCandless Fund of Emory University, the University Center in Georgia, and the Winthrop Chemical Company.

As stated above, the vitamins of the B-complex are soluble in water. This is a disadvantage to the body in the sense that because of this property these compounds cannot be stored. Since the organism functions essentially on the basis of an aqueous medium and the excretory fluids are aqueous solutions, it cannot readily retain water-soluble material. On the other hand, this is an advantage to the investigator interested in vitamin problems, because it means that an excess of these compounds will be promptly excreted, which, if adequate methods are available, may be detected primarily in the urine. Fortunately, these two vitamins lend themselves nicely to analysis by exhibiting the property of fluorescence, which in the case of riboflavin is direct and in that of thiamin is indirect. That is, when exposed to light waves of very short wave length (ultra-

violet) they give off a glow, the intensity of which may be measured by a suitable instrument called a fluorophotometer. The major remaining problem is to separate effectively the small amount of the vitamin from the other materials present in the urine samples on which the analyses are carried out. This problem seems to have been satisfactorily solved by the use of special solvents for extraction, or of special adsorbing materials to which the vitamin attaches itself and from which it may be subsequently removed.

The excess vitamin taken with each meal is ordinarily excreted by the end of four or five hours. Therefore, if a urine sample is collected in the morning before breakfast, that is, after a twelve-hour fast, its vitamin content should be indicative only of the amount in the tissues; the more present there, the more will pass into the urine, and conversely if the tissues are adequately supplied, there will be almost none found in the urine. Following this line of reasoning, we have determined the riboflavin content of fasting morning urine samples from individuals belonging to a considerable number of different economic and age groups. By these determinations we hoped to ascertain whether most people in this area obtained adequate supplies of riboflavin in their diet.

When the results of the analyses were in hand, the interpretation had to be decided upon. Since no standard had previously been set up, it became necessary to select an arbitrary base value for the riboflavin excretion in the urine, above which the individual would be considered to have an adequate riboflavin supply and below which he would be deemed deficient. For reasons which need not be enumerated here, this value was fixed at 0.3 microgram per milliliter.

On this arbitrary basis most of our groups showed a considerable deficiency. In one instance as many as sixty-five per cent of those examined were deficient, and in the case of only one group (Navy V-12 trainees obtaining their meals at the Navy Cafeteria) has the deficiency been less than twenty-five per cent. This indicates, we believe, that people in this area habitually consume considerably less than the two to three milligrams per day of riboflavin advocated as ensuring an adequate supply.

Riboflavin is found in the greatest amount in milk and liver, and

some claim that measuring riboflavin excretion is merely a roundabout and time-consuming way of ascertaining how much milk a person drinks.

It is, however, important to note that riboflavin is destroyed by light, and if the daily supply of milk is left exposed for some time after the milkman delivers it, the riboflavin content rapidly diminishes.

The story concerning thiamin ($B_1$) is in a general way quite similar. The laboratory determination is technically more difficult and requires a longer time and, therefore, for the time spent fewer data are obtained. Also, the analyst does not present them with the same assurance that he does the riboflavin figures. The relatively few analyses which we have been able to carry out have indicated that the group showing the highest number of low thiamin excretions was made up of patients at a local pre-natal clinic. This may be of considerable significance, because there is evidence pointing to the conclusion that the diet of the mother before the birth of the young has a marked effect on the physical development and vigor of the offspring. For example, work with rats at the University of Cincinnati has shown that when the diet of the pregnant female is deficient in riboflavin, a considerable number of the young rats have serious developmental abnormalities, such as lack of the lower jaw, lack of the ends of the fore-limbs, and fusion of the ribs.

The daily food intake should contain about two milligrams of thiamin, and an excellent source is the outer coat of cereal grains. This outer coat is, of course, removed during the currently-used milling processes, and if our supply of thiamin is not thereby to be notably curtailed, the resulting deficiency must be made up. This is the basis of the enrichment program which involves adding, among other materials, both thiamin and riboflavin to all the white flour which is manufactured.

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### PART II

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# EDITORIAL

The recently published and widely discussed Harvard report, *General Education in a Free Society,* has given needed publicity to certain phases of the problem of education for postwar America. Since from the foundation of the republic education has been almost the number-one public policy, its discussion has not been left solely to professionals, and the professionals have divided into many and sharply divergent schools of thought. In the long run this has been good for American education. It has given education flexibility and versatility, enabling it to serve the nation in multitudinous ways throughout a complex society.

The little red schoolhouse and ivy-hung college halls have been favorite symbols of American democracy, but whatever their sentimental values, the symbols are further and further removed from the realities to which they refer. And so the schoolmaster and the professor in their classic conceptions to a large extent have been crowded from the scene, and what they stood for has been repudiated even among the ranks of professional educators. For a long time now "academic" has been a term of reproach in their discussions of educational matters. Schoolmaster and professor have displayed a willingness, even an eagerness, to disavow their spiritual home where "the master of those who know" walked with his disciples in the freedom and peace of philosophy, the love of knowledge.

It seems to one reader that the Harvard report is soundest and most worthy of attention when it is most academic, that is, when its authors are not afraid to invoke the spirit of the liberal studies which have dominated Harvard for the greater part of her three centuries. In this spirit was conceived the idea of the core curriculum in the lower division of the college, whose aim is to impart a basis of general knowledge before a student is permitted to enter upon an increasingly narrow departmental specialization. In this spirit was conceived the recommendation that a variety of electives be mingled with specialization courses in the upper division.

We have a particular interest in this phase of the Harvard report here at Emory, for we have been working on the same plan of a

core curriculum for the lower division of the college, with a richer variety of free electives in the upper division. And we have been impelled to this plan because we have come to the conclusion that the intensive specialization toward which Emory has tended, as have most other American colleges, has been robbing our students of their birthright of a liberal education.

In an increasingly specialized world colleges cannot dispense with specialization, but the end of college education should not be the creation of absolute specialists. The less the college anticipates, or encroaches on, the rigorous task of the graduate and professional schools, the better. The American system of elementary and undergraduate education was devised as the chief tool for the creation of a classless democratic society. European distinctions of nobleman and peasant, gentleman and commoner, were to be leveled by breaking down the primary distinctions of literate and illiterate.

Illiteracy, the illiteracy of the uneducated, has unhappily not been removed after our most strenuous efforts. But what G. K. Chesterton called the illiteracy of the educated has actually been fostered in our institutions of higher learning. Our universities have poured forth a flood of graduates whose degrees have certified them competent philologists, chemists, mechanical engineers, physicians, lawyers, and ministers of the Gospel. Too often these accredited specialists have failed to measure up to any acceptable standard of the liberally educated man. Too seldom have they been well-read, or capable of effective writing; too seldom are they gifted with an enlightened curiosity about the world outside their bounded interests.

The colleges have failed in their task of education in so far as they have permitted and encouraged over-specialization. Education and specialization are not reciprocal terms. But the cure of the fault is not the abolition of specialization but its control, its liberalization. A calculated diversification of studies in the undergraduate curriculum should not raise the spectre of dilettantism which haunted the free elective system. Conservatively planned and administered, it should help make our graduates liberally educated men.

T. H. E.

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